Remember to show <u>all</u> of your work.

Problem 1. Prove that $f(x) = x^4 - x^3 - x^2 - x - 1$ has at least one horizontal tangent line on $[-1, 2]$ (no need to find the x value, just prove it has one).

Problem 2. Let $f(x) = x^2 + \dfrac{1}{x^2}$, and consider the interval $\left[-3, -\frac{1}{2}\right]$.

- Find the absolute maximum if one exists (give your answer as a point (x,y)).

- Find the absolute minimum if one exists (give your answer as a point (x,y)).